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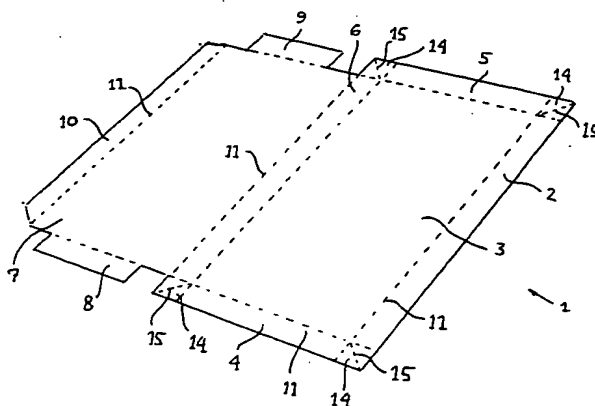
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(54) Title: **A BLOCK CARTON WITH CORNER SEGMENTS**



(57) Abstract: A method of erecting a liner for a block carton in a freezing frame intended therefor comprising an opening, comprising the steps of: providing a liner with a substantially rectangular bottom panel (3) connected to four wall panels in the form of a front and an opposed, rear side panel (2, 6) and two opposed end panels (4, 5), a substantially rectangular cover panel (7) connected along a side with the rear side panel and preferably comprising one or more cover flaps along the remaining sides of the cover, and corner segments (14) arranged in correspondence with the corners of the bottom panel and connected to both the adjoining side panel and the adjoining end panel; folding a first pair of two opposed wall panels (4, 5) down towards the bottom panel, whereby the corner segments that are connected to the wall panels are folded down on top of the adjacent wall panels (2, 6) that correspond thereto; pressing the liner down into the freezing frame whereby the second pair of not folded, adjacent wall panels are erected for abutment on the freezing frame; erecting the first pair of down-folded wall panels for abutment on the freezing frame, whereby the corner segments are folded and caused to abut between the wall panels of the first pair and the freezing frame. Such configuration of the corner segments enables the liner to be erected in a freezing frame with only a minimal risk of the corner segments being situated on the inside of the block carton thus erected.

WO 01/15977 A2

### A block carton with corner segments

The present invention relates to a method of erecting a liner for a block carton in a freezing frame intended therefor, wherein the liner comprises corner segments.

Block cartons are used for packing fresh foodstuffs prior to freezing, eg within the fishing industry for freezing fish or fish products in blocks. Today the block carton is conventionally manufactured in the form of a plane liner with pre-embossed folding or bending lines ('folding' and 'bending' are used synonymously in this application). Within the industry such liner is also known as a 'fishblock-liner' or 'blanket'. Such liner consists of a bottom panel with four wall panels, more specifically a front and a rear side panel and two opposed end panels, wherein the rear side panel is connected to one side of a cover panel, and wherein the cover panel can be configured with one or more flaps along the remaining sides of the cover. In order to ensure improved closure of the carton when erected in a freezing frame the wall panels can be provided with corner segments in the form of corner flaps secured to one single wall panel, as described eg in WO 97/11890. Such closure of the corners protects against liquid seeping out of the erected carton, and likewise the contents are protected against damage (for instance 'freeze burn') during the subsequent freezing process. The various panels are preferably interconnected in accordance with said pre-embossed folding lines. SE-B 304 952 describes how a packaging for packaging foodstuffs can be provided with corner segments connected to both the adjacent wall panels whereby a leak-proof packaging is obtained.

In order to facilitate in particular the manual folding of the block carton it can be pre-folded in accordance with one or more of the folding lines. The term 'pre-folded' (or 'pre-bent') as used herein is used to designate that the initially plane carton object has undergone a process in which it has been folded along a line in order to subsequently return to the plane state. This process entails a permanent deformation of the material fibres thereby considerably reducing the resistance to bending, which considerably facilitates the subsequent (manual) folding in connection with erection of the block carton in a freezing frame. The folding is "directionally determined" such that only folding in the predetermined direction is facilitated, whereby it is ensured that the block carton is folded correctly corresponding to the predetermined in- and outsides. Pre-folding is typically accomplished by rolling.

Conventionally, a liner for a block carton consists of a multi-layered piece of cardboard coated on the one side with a coating that is to ensure that the foodstuff does not freeze onto the interior face of the block carton. Typically the coating consists of a wax or paraffin product. In order to further ensure that the packaging can absorb a part of the moisture that is emitted during the freezing process the coating can be provided with a number of openings, typically a large number of small openings, also designated "pin-holes" that can have a maximal diameter of up to 3 mm, but typically less than 1 mm. Also these small openings have the effect that the food substance does not freeze onto the entire interior surface of the packaging and that, it follows, it is easily removed there from. In order to further control evaporation from the packaged foodstuff, the opposite side of

the packaging can also be coated, but such coating will typically not be provided with openings. For some types of block cartons a through-going coating is used for the inside, to which an uneven surface has been imparted in that the cardboard is embossed in a given pattern. As will appear, the construction of the liner takes into consideration which of the two sides of the coating that is intended as inside for the erected block carton. Therefore a liner for a block carton has predetermined in- and outsides.

The liner as described above is used on connection with a specific freezing frame intended therefor that consists of a frame with sides corresponding to the wall panels and with an opening corresponding to the bottom panel of the liner. The frame can be configured with a bottom or can be used on a surface that thus constitutes a bottom in the frame. The interior sides of the frame are oriented approximately perpendicular to the bottom. When the bottom panel of the liner is pressed down into the opening of the frame, the wall panels will be erected and abut on the insides of the frame and likewise the cover will be erected to an open position. Hereby an open block carton is created. The block carton is subsequently filled with the desired commodity, eg fresh fish, following which the cover is bent over to close the block carton. The closed block carton is subsequently frozen for eg three hours, following which the block carton is removed from the freezing frame, and the operator performs a visual inspection to verify whether the carton is closed correctly, ie a control whether corner flaps and the side flaps of the cover are located on the outside of the block carton.

It should be noted that it is important that the corner flaps and the side flaps of the cover are located on the outside of the carton, since it is undesirable to freeze them into the fish or the like. This would entail that, once the carton is removed from the frozen commodity, a part of the carton may more or less visibly remain in the commodity, which is undesirable for obvious reasons.

The work involved in erecting the block carton in the freezing frame is conventionally performed manually, which means that the mistakes described above can easily occur, especially in view of the very elevated rate at which such work is performed. However, it is also an option to erect the block carton automatically.

Various attempts have been made to solve the problem of avoiding that parts of the block carton are frozen into the fish or the like.

Thus, WO 96/02422 discloses a block carton as described above that is provided with indicators on the liner corresponding to the outsides of the folded carton, said indicators becoming visible in case of incorrect closure of the block carton. The drawback associated with this block carton is that the visual inspection of the block carton cannot be performed until the block is discharged from the square freezing frame, ie after the carton has been filled with fish or the like, closed and frozen. Erroneous closure of the block carton thus presupposes that initially fish is discharged from the carton, following which the fish must be thawed, and the filling process as such must be performed again. Thus, erroneous closure of the block carton involves a heavy workload to remedy such erroneous closure.

WO 97/11890 teaches a block carton as described above that is provided with indicators on the liner corresponding to the insides of the folded carton, said indicators becoming visible in case of erroneous closure of the corner flaps of the block carton. This type of indicators enable control of correct folding prior to filling of the carton, but the risk still exists that the indicator is overlooked.

10

It would be a third option to use both of said marking systems on the same liner, which would facilitate control during as well as after performing the work.

15 It is the object of the present invention to provide a method that will in an easy and swift manner make it possible for the operator to erect or fold a block carton of the kind described above without the corner flaps being arranged on the inside of the carton.

20

According to a first aspect of the present invention, the above is accomplished by a method wherein a liner is selected, preferably covered with paraffin on the one or both sides, wherein the corner segments are secured to both an end panel and an adjoining, front or rear side panel, such that the corner segment is folded along a line originating in that corner of the bottom panel that corresponds thereto when the wall panels are erected. Such configuration of the corner segments enables the liner to be erected in a freezing frame with only a minimal risk of the corner segments being situated on the inside of the thus erected block carton.

30

More specifically this can be ensured by the operator first folding two opposed wall panels (either the end panels or the front and rear side panel) down towards the bottom panel prior to pressing the liner down into the freezing frame, which would thereby cause the corner segments to be folded over the adjacent, not-folded wall panels whereby the corner segments will be located as corresponds to the outside of the block carton when the downwardly folded wall panels are erected.

10

Correct erection of the liner can also be ensured by the operator first pressing the corner segments together in correspondence with the folding line described above, which will cause the corner segments to be folded around the outside of one of the adjoining side panels.

15

According to a further aspect of the present invention the above is accomplished with a liner for a block carton, wherein the corner segments are secured to both an end panel and an adjoining front or rear side panel, such that the corner segment can be folded along a line that originates in that corner of the bottom panel that corresponds thereto when the side panels are erected.

20

In order to ensure easy folding of the corner segment it can advantageously be configured such that the corner segment is cut along its free rim such that the folding line through the corner segment is shortened compared to a rectangular corner segment that completely fills the space between the two adjoining wall panels.

30

Even though the present invention very reliably ensures that the liner is erected correctly in the freezing frame, incorrect erection will, however, be theoretically

possible and therefore the liner can advantageously be configured with either the one or both of the above-mentioned indicator systems.

- 5 The invention will now be explained in further detail with reference to the drawing, wherein

Figure 1 is a perspective top view of the inside of a not-folded liner for a block carton according to the invention;  
10

Figure 2 is a perspective view of a first step in the erection of the liner;

- 15 Figure 3 is a perspective view of a second step in the erection of the liner;

Figure 4 is a perspective view of a third step in the erection of the liner, wherein all the side panels have been erected;  
20

Figure 5 is a perspective view of the folding of the corner segment between the second and third steps;

- 25 Figure 6 is a sectional view of the liner with a first configuration of a corner segment;

Figure 7 is a sectional view of the liner with an alternative embodiment of a corner segment;

30

Figure 8 shows a liner as shown in Figure 1, but seen from the underside, and featuring indicators to ensure correct erection of the block carton; and



Figure 9 is a sectional view of the liner as shown in Figure 6 with indicators configured on the corner segment.

5    Description of advantageous embodiment

All figures are schematic and not necessarily to scale and they show only details that are essential to the understanding of the invention, while other details have  
10    been omitted for the sake of clarity. In all figures the same reference numerals are used for identical or corresponding elements.

Figure 1 shows a liner 1 for a block carton prior to  
15    folding. In the embodiment shown the liner 1 is made of cardboard coated with paraffin and configured for being used in connection with freezing of fish.

The liner 1 is constituted by a front side panel 2 that  
20    is, along the one side, connected to a rectangular bottom panel 3. Besides, the bottom panel 3 is connected to two end panels 4, 5 and a rear side panel. The rear side panel 6 is yet again connected to a rectangular cover  
25    panel 7 that is, along its sides, provided with cover side flaps 8, 9 and, along its front edge, it is provided with a front cover flap 10. As will appear each of the wall panels have a length like the side of the bottom panel that corresponds thereto.

30    All of the above-mentioned elements are connected to each other corresponding to pre-embossed folding lines or so-called cardboard bridges 11 that are shown by dotted lines in Figure 1. This provides a higher degree of reliability that that the block carton is folded correctly

during the erection or folding process. As described initially the block carton can be pre-folded corresponding to one or more of the folding lines. The distance between the free edge of the side panels and their connection with the bottom panel is designated the height of the side panel.

The bottom panel 3 of the liner is, as mentioned above, connected to wall panels 2, 4, 5, 6 that are substantially rectangular and of equal height. Corresponding to the corners of the bottom panel the liner is provided with corner segments 14 that are, via two cardboard bridges, connected to the two adjoining wall panels. As will appear from Figure 1, the corner segments thus fill the area between the wall panels. The corner segments are provided with folding lines 15.

Since the wall panels all have to be erected perpendicular relative to the bottom panel, the cardboard bridges that connect the corner segments to the wall panels are all arranged perpendicular to the cardboard bridge that connects the respective wall panel with the bottom panel. Thus, each corner segment is provided with a folding line 15 that divides into two the angle of  $90^\circ$  between the two cardboard bridges where the corner segment is connected to the adjoining wall panels. In Figure 1, the corner segments are shown with square configurations, but they can - as will be described below - be configured in many other ways.

30

Figure 2 shows a first step in the erection of the liner. As is marked by the arrows 100 an operator folds the two opposed end panels 4,5 down towards the bottom panel 3. As will appear from the figure the corner segments are

folded along with the side panels down towards the bottom panel. In principle, instead of the end panels also the front 2 and the rear 6 side panels can be folded down towards the bottom panel, but in view of the fact that the rear side panel is connected to the cover panel 7 such procedure with render the process more difficult.

Figure 3 shows the next step in the erection of the liner. As marked by the arrows 101, the front and rear side panels are now folded upwards to a substantially perpendicular position relative to the bottom panel. As will appear from the figure, this means that the corner segments are now folded upwards along with the front and rear side panels. This folding takes place by the operator pressing the bottom panel 3 of the liner down into a freezing frame (not shown), whereby its sides press the side panels as well as the corner segments upwards as described. Since the freezing frame has an opening corresponding to the dimensions of the bottom panel, and since the interior, plane sides of the freezing frame are oriented perpendicular to its bottom (or corresponding to the face on which the freezing frame is arranged) it is hereby ensured that the side panels are erected to perpendicular relative to the bottom panel.

Figure 4 shows the next step in the erection of the liner. As marked by the arrows 102, the operator folds the two opposed end panels 4,5 outwards towards the freezing frame (not shown) to a position substantially perpendicular to the bottom panel. As will appear from the figure this causes the corner segments to be folded along their folding lines in order for them to subsequently abut on the outside of the end panels (relative to the now folded block carton). In Figure 5 it is illus-

trated how, during erection of the end panel, the corner segment is "forced" to fold, and corresponding to the folding lines moves away from the rear side panel in order to subsequently abut on the outside of the end panel.

5 Albeit it is theoretically possible to erect the panel and convey it past the corner segment such that it folds corresponding to the inside of the end panel, this would entail a considerably more comprehensive deformation of end panel and corner segment and therefore this would

10 hardly occur in practice.

The operator subsequently fills the block carton with the desired commodity that is to be frozen, eg fresh fish, following which the block carton is closed by folding the

15 cover panel, and its flaps 8, 9, 10 are arranged between the wall panels and the freezing frame (not shown). As will appear from Figure 1 the side flaps 8,9 of the cover does not extend completely to the front and rear edges, respectively, of the cover whereby it is avoided that the

20 side flaps come to rest on the outside of the corner segments which could cause an undesirably thick wall corresponding to the corners.

Figure 6 shows a preferred embodiment of a corner segment.

25 The corner segment 14 is connected partly to an adjoining end panel 4 via a first cardboard bridge 20, partly to an adjoining, rear side panel 6 via a second cardboard bridge 21 arranged perpendicular to the first cardboard bridge 20 whereby the corner segment spans 90°.

30 Since said wall panels have the same height h, the corner segment is provided with a folding line 15 that halves said 90°-angle. Opposite the first cardboard bridge 20 the corner segment has a first free edge 30, and opposite the second cardboard bridge 21 the corner segment has a

second free edge 31. As will appear from the figure, the second free edge 31 is cut obliquely such that it is non-parallel with the opposite cardboard bridge 21, and such that the first free edge 30 is shorter than its opposed cardboard bridge 20, whereby it is ensured that the folding line 15 of the corner segment is shortened compared to a situation in which the corner segment as a square fills the entire space between the adjoining side panels. The corner segment could also be configured such that the first free edge is cut obliquely or such that both free edges are cut obliquely as shown in Figure 7, since the essential is the desire to have a shorter folding line 15. This could also be ensured with a corner segment where the cardboard bridges to the adjoining wall panels have an expanse that is smaller than the height of the wall panels, which would, however, entail a poorer closure of the corner. In order to avoid that the side flaps come to rest on the outside of the folded corner segments, the side flap should be located on the lateral edge of the cover panel at a distance  $a$  that exceeds the height  $h$  on the wall panels.

As described initially, the liner can be provided with indicators that enable a control whether the block carton has been erected or folded correctly. Figure 8 shows a liner as shown in Figure 1, but seen from the underside. The liner is provided with indicators 40 corresponding to the areas that are covered by the corner segments when the liner has been folded correctly and as described with reference to Figures 2 through 4. Besides, the liner is provided with indicators 41 corresponding to the areas that are covered by the cover panel flaps when the cover has been closed correctly with the cover flaps arranged on the outside of the side panels. The liners described

in the present application being conventionally supplied with a print or an ornament corresponding to the outside of the block carton, the described markings must be positioned corresponding to this outside.

5

As also described above, the liner can also feature indicators corresponding to the inside of the block carton. Figure 9 shows an example in which an indicator (42) is positioned on the inside of a corner segment, for instance as shown like a single marking across the folding line of the corner segment. This means that the marking will be visible to the operator in case the corner segment should inadvertently be folded into the block carton. In the opposite event, correct erection of the block carton with the corner segment arranged on the outside of this would cause the indicator to be hidden.

10  
15

Many modifications can be performed to the effect that the indicators can be configured in different ways. Thus they may be in the form of various patterns or colour indicators, and they can also have various shapes.

20

C l a i m s

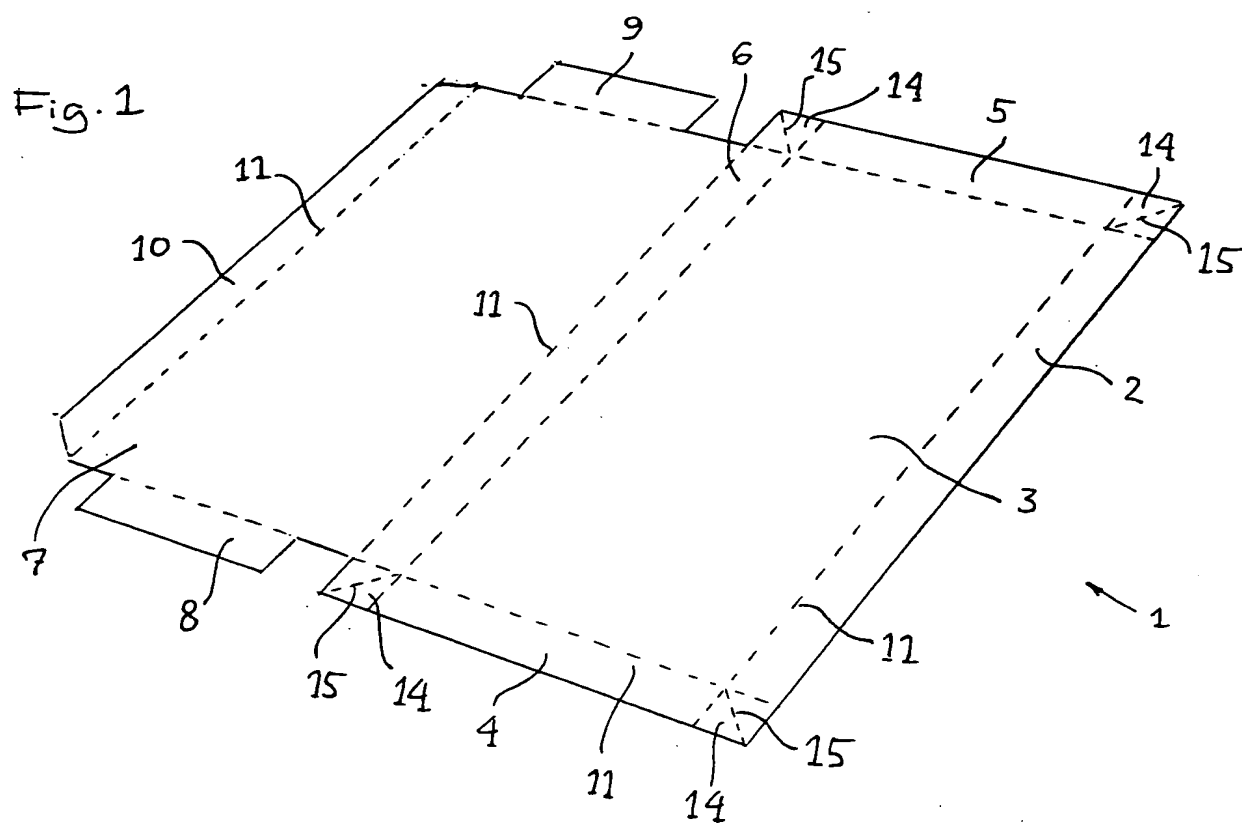
1. A method of erecting a liner for a block carton in a freezing frame intended therefor comprising an opening,  
5 comprising the steps of:

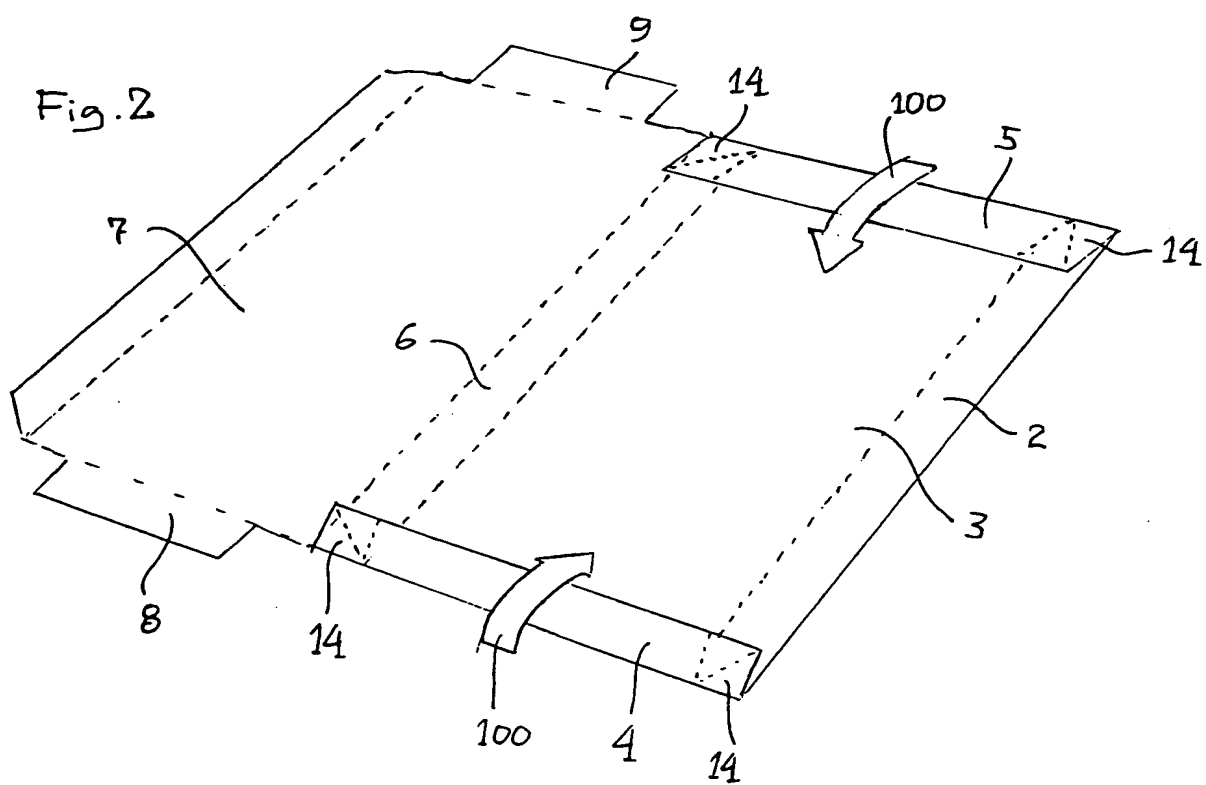
- providing a liner, where the liner comprises a substantially rectangular bottom panel (3) connected to four wall panels in the form of a front and an opposed, rear side panel (2,6) and two opposed end  
10 panels (4,5), a substantially rectangular cover panel (7) connected along a side to the rear side panel and preferably comprising one or more cover flaps along the remaining sides of the cover, and corner segments (14) arranged in correspondence with  
15 the corners of the bottom panel and connected to both the adjoining side panel and the adjoining end panel;
- folding a first pair of two opposed wall panels (4,5) downwards towards the bottom panel, whereby  
20 the corner segments that are connected to the wall panels are folded down on top of the adjacent wall panels (2,6) that correspond thereto;
- pressing the liner down into the freezing frame whereby the second pair of not folded, adjacent wall  
25 panels are erected for abutment on the freezing frame;
- erecting the first pair of down-folded wall panels for abutment on the freezing frame, whereby the corner segments are folded and caused to abut between  
30 the wall panels of the first pair and the freezing frame.

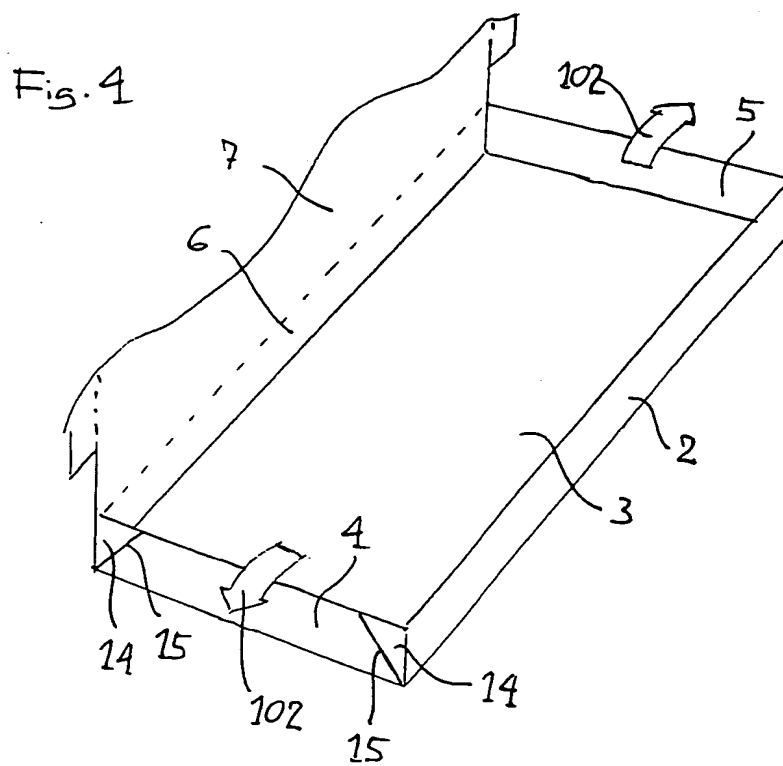
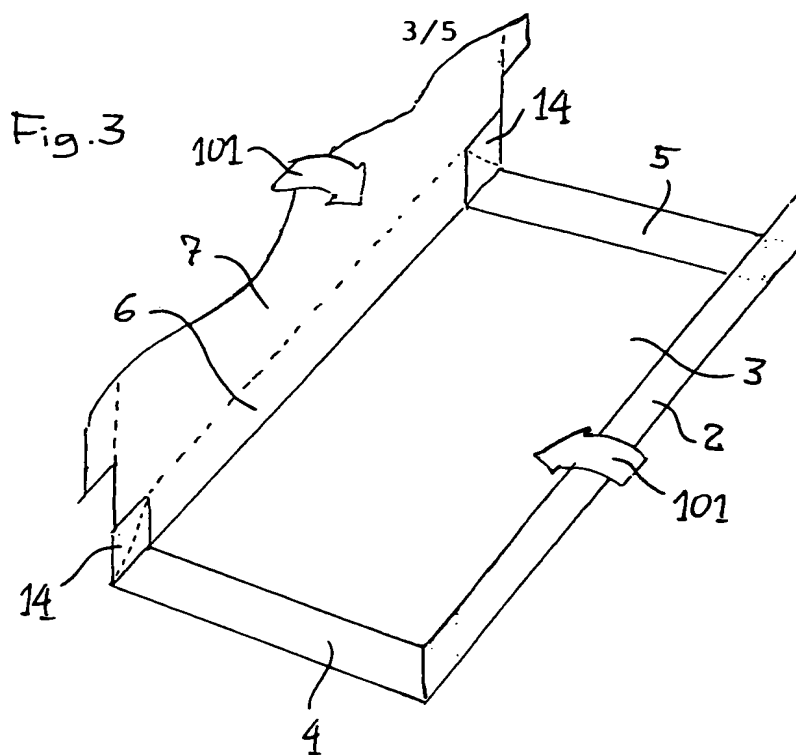
2. A method according to claim 1, **characterised in that** the first pair of opposed wall panels are the end panels (4,5).
- 5 3. A method according to claim 1 or 2, **characterised in that** the respective panels are connected to each other corresponding to pre-embossed folding lines.
- 10 4. A method according to claim 3, **characterised in that** the block carton corresponding to one or more of the folding lines is pre-folded.
- 15 5. A method according to any one of claims 1 through 4, **characterised in that** the corner segments comprise a pre-embossed folding line originating in a corner on the bottom panel that corresponds thereto and dividing the corner segment into two areas.
- 20 6. A method according to any one of claims 1 through 5, **characterised in that** the corner segments have an expanse that is smaller than the area situated within the hypothetical extension of the upper edges of the adjoining wall panels.
- 25 7. A method according to any one of claims 1 through 6, **characterised in that** the liner is provided with indicators (40) corresponding to the areas that are covered by the corner segments and optionally the cover flaps when the liner has been folded correctly with the corner segments and optionally the cover flaps arranged on the outside of the erected block carton.
- 30 8. A method according to any one of claims 1 through 7, **characterised in that** one or more of the corner segments

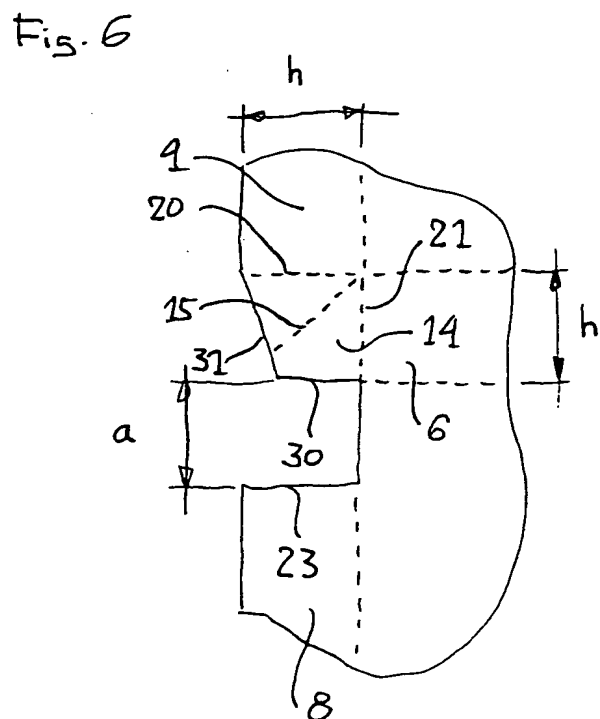
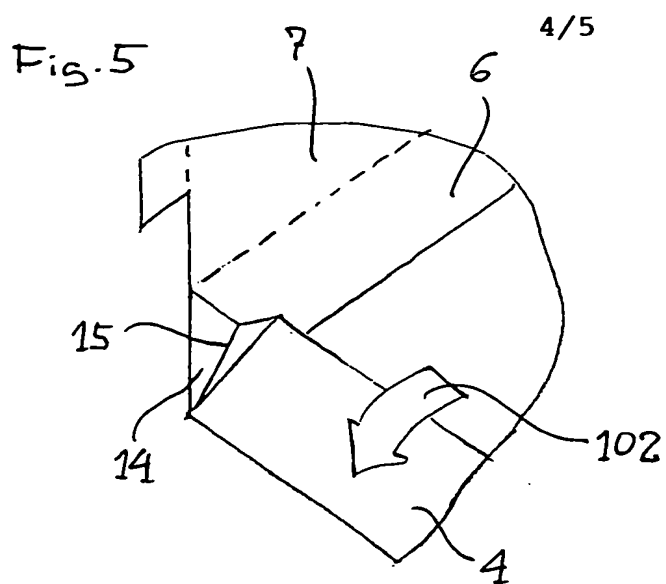


is/are provided with indicators (42) corresponding to the inside of the liner.









Fis. 7

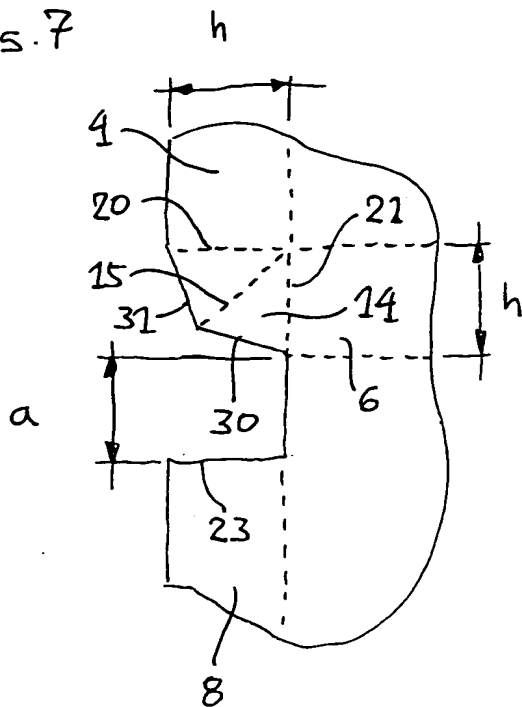


Fig. 9

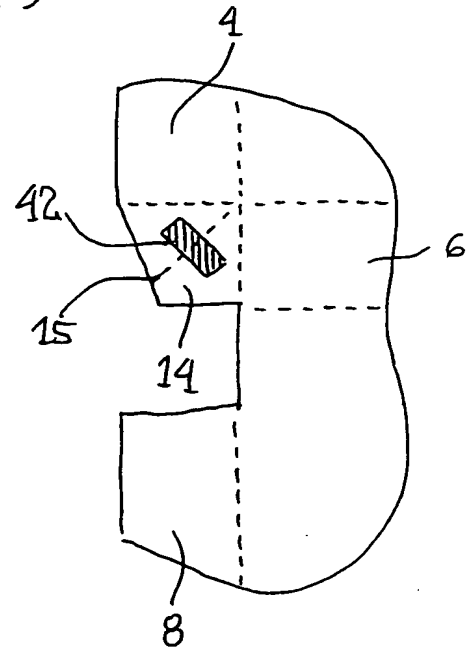


Fig. 8

